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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/522,948	11/03/2005	Jie Hong Di	101547.55778US	4664

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CROWELL & MORING LLP  
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EXAMINER
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BROWN, COURTNEY A

ART UNIT	PAPER NUMBER
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1616

MAIL DATE	DELIVERY MODE
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10/15/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/522,948	<b>Applicant(s)</b> DI ET AL.	
	<b>Examiner</b> COURTNEY BROWN	<b>Art Unit</b> 1616	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 May 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 59-100 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 59-100 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                        |                                                                   |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/24/08 and 2/6/09</u> .                                     | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Election/Restriction*

Applicant's election, without traverse, of **dicyandiamide** (DCD) as the nitrification inhibitor component in the reply filed on May 27, 2009 is Acknowledged.

### *Acknowledgement of Receipt/Status of Claims*

This Office Action is in response to the amendments filed December 24, 2008 and April 24, 2009. Claims 59-100 are pending in the application. Claims 1-58 have been cancelled. In the amendment filed December 24, 2008, claims 59-97 were newly added. In the amendment filed April 24, 2009, claims 59, 67, 75, 77, 82 and 85 were amended and claims 98-100 were newly added. Claims **59-100** are being examined for patentability.

Rejections not reiterated from the previous Office Action are hereby withdrawn. The following rejections and/or objections are either reiterated or newly applied. They constitute the complete set of rejections and/or objections presently being applied to the instant application.

***Withdrawn Rejections***

The rejection of claims 36-55 under 35 U.S.C. 103(a) over Sutton et al. (US 4,994,100), Naohiko et al. (Japanese Journal of Soil Science, 2001, volume 72, number 2, pages 206-213), and Cookson et al. (Soil Biology and Biochemistry 34, 2002, pages 1461-1465) in view of Smutek et al., (US Patent 4,560,796) has been **withdrawn**.

***New Rejection(s) Necessitated by the Amendments filed on December 24, 2008 and April 24, 2009***

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

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2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Claims 59-100 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cookson et al. (Soil Biology and Biochemistry 34, 2002,pages 1461-1465) in view of Sutton et al. (US 4,994,100) and Smutek et al., (US Patent 4,560,796).**

### ***Applicant's Invention***

Applicant claims a soil treatment method for use in a pasture farming system comprising applying a nitrification inhibitor in a solution form, crystalline form, or a fine

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particle suspension form to cover substantially the whole of an area of grazed pasture soil, comprising animal urine and non-urine patch areas, to reduce: nitrate leaching; nitrous oxide emissions; potassium, calcium or magnesium leaching; and to increase pasture production.

***Determination of the scope and the content of the prior art  
(MPEP 2141.01)***

Cookson et al. teach that nitrification inhibitors such as dicyandiamide offer potential for decreased losses through denitrification and leaching by delaying the microbial transformation of ammonium-N to  $\text{NO}_3^-$  (page 1461). Cookson et al. additionally teach, in an experiment, the application of DCD to urine-amended and control soils under field conditions. Cookson et al. teach applying DCD with urine or water to a pasture in the time period of February to March with 4 replicated treatments (page 1461).

***Ascertainment of the difference between the prior art and the claims  
(MPEP 2141.02)***

The difference between the invention of the instant application and that of Cookson et al. is that Cookson et al. do not expressly teach a soil treatment method for use in a pasture farming system comprising applying DCD and urea. This deficiency in Cookson et al. is cured by the teachings of Sutton et al. Sutton et al. teach an aqueous nitrogen fertilizer consisting of urea and dicyandiamide with features to

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minimize nitrogen loss in field crop (abstract, claims 36, 41, and 48 of instant application). Sutton et al. teach that said nitrogen fertilizer is granular and is applied to a field by means of a drop spreader or a broadcast spreader (column 4, lines 14-17). Additionally, Sutton et al. teach that dicyandiamide functions in the fertilizer as a slow release source of nitrogen (column 5, lines 7-12).

The difference between the invention of the instant application and that of Cookson et al. is that Cookson et al. do not expressly teach a soil treatment method for use in a pasture farming system comprising applying a DCD in crystalline form. This deficiency in Cookson et al. is cured by the teachings of Smutek et al. Smutek et al. also teach a process for the modification of the crystal form of dicyandiamide wherein it can be readily handled and measured (column 1, lines 31-47, claim 44 of instant application).

***Finding of prima facie obviousness***

***Rationale and Motivation (MPEP 2142-2143)***

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Cookson et al. and Sutton et al. to arrive at a soil treatment method for use in a pasture farming system comprising applying DCD and urea. It is known to one of ordinary skill in the art that urea is applied to soil as a fertilizer. Further, Michaud et al. (GB 2076795 A) teach that the use of dicyanidiamide (DCD) with nitrogen-containing fertilizers such as urea enhances the solubility of

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micronutrients (page 2, lines 29-40). One would be motivated to make this combination in order to receive the expected benefit of a method for soil management in pasture farming systems that provide nitrification inhibition as well as fertilizing properties to the treated pasture which would inherently provide increased pasture production.

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Cookson et al. and Smutek et al. to arrive at a soil treatment method for use in a pasture farming system comprising applying DCD in crystalline form. Smutek et al. teach that dicyandiamide tends to cake when handling (column 1, lines 17-20). Further, Michaud et al. (GB 2076795 A) teach that DCD is a solid, crystalline substance (page 1, lines 23-25). One would be motivated to make this combination in order to receive the expected benefit of a method for soil management in pasture farming systems using an improved form of DCD that is easier to handle due to its outstanding flow and storage prosperities as well as its improved mechanical strength.

In reference to instant claims 59-100, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In the instant case, Applicant is claiming a soil treatment method comprising applying a nitrification inhibitor in the solution, crystalline, or fine particle suspension form with water to animal and non-animal urine areas of grazed pasture soil that is contained in at least one paddock. The teaching of the aforementioned references



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meet the instant method as claimed. Cookson et al. teach applying DCD to grazed pasture soils multiple times in the Spring. However, applying DCD in the Spring and/or Autumn twice or multiple times a year is merely judicious selection and routine optimization by one of ordinary skill in the art in the absence of evidence to the contrary. Absent a showing of unexpected results, it would be obvious to one of ordinary skill in the art to vary application of the instant nitrification inhibitor.

It is duly noted that the composition of the prior art is the same as Applicant's composition. Thus, the skilled artisan would recognize that a composition is inseparable from its properties. Hence, all the properties associated with Applicant's compositions would also be possessed by the compositions of the prior art. Products of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. ***In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658(Fed. Cir. 1990.** Thus, the application of a composition that consists of the same components (i.e. DCD and/or urea) will possess the same properties and therefore lead to identical, desired results as disclosed instant claims 59-100 (i.e., increased pasture production, reduction in nitrate leaching by 42-76% for urine-N, nitrous oxide emissions, reduction in nitrate leaching loss from about 118 to about 46 N ha<sup>-1</sup>y<sup>-1</sup>, promoting permeation throughout a soil surface layer, reduced NO<sub>3</sub><sup>-</sup>N concentration wherein the reduced concentration is about 7.7 mg NL<sup>-1</sup> from about 19.7 mg NL<sup>-1</sup>, reduction in total annual nitrate leaching loss from about 488 to about 112 N ha<sup>-1</sup>y<sup>-1</sup>, etc.).

All the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

Therefore, the claimed invention as a whole would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made because every element of the invention has been fairly suggested by the cited reference.

### ***Response to Arguments***

Applicant's arguments, filed December 24, 2008, with respect to the 103 rejection of claims 36-55 under 35 U.S.C. 103(a) over Sutton et al. (US 4,994,100), Naohiko et al. (Japanese Journal of Soil Science, 2001, volume 72, number 2, pages 206-213), and Cookson et al. (Soil Biology and Biochemistry 34, 2002, pages 1461-1465) in view of Smutek et al., (US Patent 4,560,796) have been considered but are moot in view of the new ground(s) of rejection. However, because the teachings of Cookson et al. and Smutek et al. and Sutton et al. have been used in the instant rejection, the Examiner will address Applicant's arguments related to the aforementioned references.

Applicant argues that the methods of the present invention are not taught or suggested by the cited art and they provide wholly unexpected results. However, these arguments are not convincing because Applicant has not provided any data showing that the instant method as claimed provide unexpected results.

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Applicant argues that the work of Cookson et al. does not demonstrate directly that the application of DCD decreases nitrate leaching, nor does it demonstrate reductions in nitrous oxide emissions and cation leaching or the benefit of increased pasture. Applicant concedes that Cookson et al. teach away from treating the whole area of grazed pasture soil with a nitrification inhibitor by teaching that treatments of with DCD, did not increase pasture production. However, the Examiner disagrees with this argument because Cookson et al. teach that nitrification inhibitors such as dicyandiamide offer potential for decreased losses through denitrification and leaching by delaying the microbial transformation of ammonium-N to  $\text{NO}_3^-$  (page 1461). Cookson et al. teach that, when comparing pasture yields of urine-amended versus control soils treated with DCD, there is no difference in pasture yields. Thus, Cookson et al. is teaching that the application of DCD to pasture that has not been affected by urine does not increase pasture production.

Applicant argues that Sutton et al. does not relate to the treatment of grazed pasture land to reduce e.g. nitrate leaching, nitrous oxide emission and potassium calcium or magnesium leaching or to increasing production in a grazed pasture area because the focus of Sutton et al. is a formulation mixture. However, the Examiner disagrees with this argument because Sutton et al. teach an aqueous nitrogen fertilizer consisting of urea and dicyandiamide with features to minimize nitrogen loss in field crop (abstract, claims 36, 41, and 48 of instant application). Sutton et al. teach that the said nitrogen fertilizer is granular and is applied to a field by means of a drop spreader or a broadcast spreader (column 4, lines 14-17). Thus, the composition taught by

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Sutton et al. would inherently reduce e.g. nitrate leaching, nitrous oxide emission and potassium calcium or magnesium leaching or to increasing production in a grazed pasture area.

Therefore, the claimed invention as a whole would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made because every element of the invention has been fairly suggested by Cookson et al. in view of Sutton et al. and Smutek et al.

### ***Conclusion***

The claims remain rejected.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR Only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Courtney Brown, whose telephone number is 571-270-3284. The examiner can normally be reached on Monday-Friday from 8 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisor, Johann Richter can be reached on 571-272-0646. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Courtney A. Brown  
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Technology Center 1600  
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/Johann R. Richter/  
Supervisory Patent Examiner, Art Unit 1616